

UNITED STATES PATENT AND TRADEMARK OFFICE  
CERTIFICATE OF CORRECTION

PATENT NO. : 7,642,219 B2  
APPLICATION NO. : 10/586171  
DATED : January 5, 2010  
INVENTOR(S) : Tsuaki Odaka et al.

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Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

~~\_\_\_\_\_~~ Columns 55 and 56

Delete claims ~~1-13~~.

note corrected  
1-16 and substitute therefore the attached  
claims 1-13.

note  
Delete the title page and substitute therefore the attached  
title page showing corrected number of claims in patent.

note  
This certificate supersedes certificate of correction  
issued March 30, 2010.

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the upper surface.

1-10. (Canceled)

resistant slip layer, an adhesive layer, and a dye layer, wherein

said heat resistant slip layer is provided on one side of said substrate,

said adhesive layer and said dye layer are provided in that order on the other

side of said substrate, and

said adhesive layer comprises a modified polyvinylpyrrolidone resin and a copolymer of an N-vinylpyrrolidone and a vinyl polymerizable monomer.

18. (Previously Presented) The thermal transfer sheet according to claim 17,

wherein the content of said modified polyvinylpyrrolidone resin in the adhesive layer

is 10% by weight to 50% by weight based on the total solid content of the

component(s) constituting the adhesive layer.

19. (Previously Presented) The thermal transfer sheet according to claim 17,

wherein the coverage of the component(s) constituting the adhesive layer is 0.01 to 0.3

g/m<sup>2</sup> on a dry basis of the adhesive layer.

1. A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein

said heat resistant slip layer is provided on one side of said substrate,

said adhesive layer and said dye layer are provided in that order on the other

side of said substrate, and

said adhesive layer comprises a polyvinylpyrrolidone resin and a saccharide or a sugar alcohol.

2. [REDACTED] The thermal transfer sheet according to claim 1, wherein the content of said saccharide or sugar alcohol in said adhesive layer is 5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

3. [REDACTED] The thermal transfer sheet according to claim 1, wherein the coverage of the component(s) constituting the adhesive layer is 0.05 to 0.3 g/m<sup>2</sup> on a dry basis of the adhesive layer.

4. [REDACTED] A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein  
said heat resistant slip layer is provided on one side of said substrate,  
said adhesive layer and said dye layer are provided in that order on the other side of said substrate, and  
said adhesive layer comprises a polyvinylpyrrolidone resin and a complex forming agent.

5. [REDACTED] The thermal transfer sheet according to claim 4, wherein the content of said complex forming agent is 0.5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

6. [REDACTED] The thermal transfer sheet according to claim 4, wherein the coverage of the component(s) constituting the adhesive layer is 0.05 to 0.3 g/m<sup>2</sup> on a dry basis of the adhesive layer.

[REDACTED]

note

7 [REDACTED] A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein  
 said heat resistant slip layer is provided on one side of said substrate,  
 said adhesive layer and said dye layer are provided in that order on the other side of said substrate, and  
 said adhesive layer comprises a polyvinylpyrrolidone resin and a modifying agent for modifying said resin, wherein said modifying agent is at least one of carboxymethylcellulose, cellulose acetate, cellulose acetate propionate, dibutyl tartrate, dimethyl phthalate and shellac resins.

8 [REDACTED] The thermal transfer sheet according to claim 7, wherein the content of said modifying agent is 0.5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

9 [REDACTED] The thermal transfer sheet according to claim 7, wherein the coverage of the components constituting the adhesive layer is 0.05 to 0.3 g/m<sup>2</sup> on a dry basis of the adhesive layer.

10 [REDACTED] A thermal transfer sheet comprising: a substrate; and an adhesive layer and a dye layer provided in that order on at least one side of the substrate, wherein

said adhesive layer comprises a polyvinylpyrrolidone resin,

(A) at least one component selected from the group consisting of polyurethane resins and acrylic polyol resins that are soluble in a mixed solvent composed of methyl ethyl ketone and isopropyl alcohol at a weight ratio of 1 : 1 and, even when diluted to a solid content of 5% by weight, do not gel, and

(B) at least one component selected from the group consisting of isocyanates, blocked isocyanates, and aluminum chelating agents that are soluble in a mixed

[REDACTED]

solvent composed of methyl ethyl ketone and isopropyl alcohol at a weight ratio of 1 : 1 and, even when diluted to a solid content of 5% by weight, do not gel.

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11. [REDACTED] The thermal transfer sheet according to claim [REDACTED], wherein said adhesive layer further comprises a modification product of a polyvinylpyrrolidone resin.

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12. [REDACTED] The thermal transfer sheet according to claim [REDACTED], wherein

the content of at least one component selected from said group (A) in said adhesive layer is 1% by weight to 30% by weight based on the total solid content of the components constituting the adhesive layer, and

the content of at least one component selected from said group (B) in said adhesive layer is 1% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

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13. [REDACTED] The thermal transfer sheet according to claim [REDACTED], wherein the coverage of the components constituting the adhesive layer is 0.01 to 3.0 g/m<sup>2</sup> on a dry basis of the adhesive layer.

[REDACTED]



US007642219B2

(12) **United States Patent**  
**Odaka et al.**

(10) **Patent No.:** **US 7,642,219 B2**  
(45) **Date of Patent:** **Jan. 5, 2010**

(54) **THERMAL TRANSFER SHEET**

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(\*) **Notice:** Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 179 days.

(21) **Appl. No.:** **10/586,171**

(22) **PCT Filed:** **Jan. 20, 2005**

(86) **PCT No.:** **PCT/JP2005/000700**

§ 371 (c)(1),  
(2), (4) **Date:** **Jul. 17, 2006**

(87) **PCT Pub. No.:** **WO2005/068210**

**PCT Pub. Date:** **Jul. 28, 2005**

(65) **Prior Publication Data**  
**US 2008/0069982 A1** **Mar. 20, 2008**

(30) **Foreign Application Priority Data**  
**Jan. 20, 2004 (JP) ..... 2004-011610**  
**Mar. 1, 2004 (JP) ..... 2004-055681**  
**Mar. 1, 2004 (JP) ..... 2004-055682**  
**Mar. 12, 2004 (JP) ..... 2004-070969**  
**Mar. 25, 2004 (JP) ..... 2004-089716**

(51) **Int. Cl.**  
**B41M 5/50** (2006.01)  
**B41M 5/42** (2006.01)

(52) **U.S. Cl.** ..... **503/227; 428/32.81**

(58) **Field of Classification Search** ..... **None**  
See application file for complete search history.

(56) **References Cited**

#### U.S. PATENT DOCUMENTS

3,216,983 A	11/1965	Shelanski et al.
5,106,217 A	4/1992	Mecke et al.
5,147,843 A	9/1992	Bodem et al.
5,306,691 A	4/1994	Bauer et al.
2003/0181331 A1	9/2003	Ieshige et al.

#### FOREIGN PATENT DOCUMENTS

JP	02-074375 A1	3/1990
JP	05-131760 A1	5/1993
JP	07-179072 A1	7/1995
JP	2002-274046 A1	9/2002
JP	2003-312151	11/2003
JP	2003-312151 A1	11/2003
JP	2004-074766 A1	3/2004

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(57) **ABSTRACT**

Disclosed is a thermal transfer sheet that can meet demands for increased printing speed in thermal transfer, higher density of thermally transferred images, and higher quality. The thermal transfer sheet comprises a substrate and an adhesive layer and a dye layer provided in that order on one side of the substrate, wherein the adhesive layer comprises a polyvinylpyrrolidone resin and a composition for suppressing hygroscopic properties of the polyvinylpyrrolidone resin.

**13 Claims, 1 Drawing Sheet**

